



## **NASA STTR 2011 Phase I Solicitation**

### **T3.01 Technologies for Space Power and Propulsion**

**Lead Center: GRC**

Development of innovative technologies are sought that will result in durable, long-life, lightweight, high performance space power and in-space propulsion systems to substantially enhance or enable future missions.

Innovations for space power systems are sought that will offer significant improvements in system safety, efficiency, mass specific power, operating temperature range, radiation hardness, stowed volume, design flexibility/reconfigurability, autonomy, and affordability. In the area of power generation, advances are needed in photovoltaic cell technology (e.g., materials, structures, and incorporation of nanomaterials); solar array module/panel integration (e.g., advanced coatings, advanced structural materials, monolithic interconnects, and high-voltage operational capability); and solar array designs (e.g., ultra-lightweight deployment techniques for planar and concentrator arrays, restorable/redeploy able designs, high power arrays, and planetary surface concepts). For energy storage technology, advances are needed in primary and rechargeable batteries, fuel cells, flywheels, regenerative fuel cell systems, and innovative design methods. Advances are also needed in power management and distribution systems, power system control, energy conversion technology (such as Stirling and Brayton systems) and integrated health management. Advanced nuclear power and other innovative concepts and related technologies are also sought.

Innovations, advanced concepts and processes are sought for in-space propulsion, including electric propulsion, chemical propulsion, advanced rocket propellants/alternative fuels, nuclear propulsion, and tether technology. In electric propulsion, concepts for subcomponent improvements are needed for electric propulsion systems, including cathode technologies, electrode-less plasma production, low-erosion materials, high-temperature magnetics, and lightweight simplified power processing systems. Innovations are also desired for low thrust trajectory analysis tools and new diagnostic techniques to quantify thruster performance and lifetime. In small chemical thruster propulsion technology, advances are sought for non-catalytic ignition methods for advanced monopropellants and high-temperature, reactive combustion chamber materials. Advances are also sought for chemical, electrostatic, or electromagnetic miniature and precision propulsion systems.

